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CIA/OTI IR 98-211

Intelligence Report

Office of Transnational Issues — *23 October 1998*

Caspian Oil: Exploration and Investment Keys to Growth [redacted]

The Caspian region's large petroleum resource potential and local governments' willingness to allow foreign participation in projects position the area to become a major new source of oil for world markets. [redacted] the region holds about 65 billion barrels of potentially recoverable oil—similar to the North Sea—although some observers have speculated that recoverable resources could be as much as 200 billion barrels. [redacted]

Our forecast of Caspian oil production—developed with the support of industry experts—is based on a model that [redacted] *indicates that future production levels respond most sensitively to investment flows and exploration activity:*

- Under our baseline scenario, foreign investment reaches $170 billion—about $10 billion annually—between 1998 and 2015, funding a robust level of exploration projects. International oil firms have already planned to spend approximately $100 billion on Caspian projects. At this rate of investment oil production will rise from 900,000 barrels per day (b/d) in 1998 to about 4 million b/d in 2015. The majority of production will come from Kazakhstan, followed by Azerbaijan, Turkmenistan, and Russia.

- A uniform 25-percent increase in investment over the forecast period would provide additional funds for exploration projects, which would yield new field discoveries and boost aggregate production to 5 million b/d by 2015. A 25-percent decrease in investment would reduce funding for exploration and limit production to about 2.9 million b/d by 2015. [redacted]

Investment and exploration activity over the next five years will be critical for the expansion of production through the latter half of the forecast period. New production resulting from continued investment in projects established as of the end of 1997 is the main driver of output between 1998 and 2010. Production in the later forecast years, however, largely will be determined by new projects stemming from exploration activities between 1998 and 2005. [redacted]

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Depressed world oil markets present the most significant uncertainty in our forecasts. An outlook for prolonged low oil prices will prompt some companies to delay oil field development plans or even pull out altogether from projects that operate at the margin of profitability. Low oil prices also would dissuade investors from funding critical exploration activities. *Regional political and economic stability and the availability of critical equipment are other unpredictable factors that could influence the pace of investment and production levels in the Caspian.*

Caspian oil pipeline development will be another important element in determining the region's oil production level. *The existence of adequate export capacity will ensure producers have access to world oil markets and prompt them to move forward with a full slate of development activity; at the same time, however, investors are unlikely to fund major export projects unless they are ensured that there will be adequate production volumes:*

- *Oil development projects already underway will produce sufficient volumes in the next decade to justify US-promoted export corridors—such as a Baku-Ceyhan main export pipeline and the Caspian Pipeline Consortium projec—as long as investment continues to flow into the region and regional production is aggregated.* However, our forecast indicates that there is unlikely to be enough oil to support the volume requirements for more than one or two major new pipelines.

- The completion of new pipelines will need to coincide closely with scheduled production increases to ensure the availability of appropriate capacity and commercial feasibility for producers and pipeline operators. *If US-backed pipeline proposals fail to move forward in line with production increases, Iranian and Russian exporters could begin to secure intermediate and eventually longer term export commitments.*

Caspian Poised To Become Major Oil Supplier [redacted]

The Caspian Sea region[1] has the resource potential to become one of the most important new suppliers for global oil markets in the coming decade. The area's large resource base and the willingness of local governments to allow foreign participation in petroleum projects make it highly attractive to foreign energy investors. Oil industry predictions of long-term oil production vary widely, ranging from 3.5 million b/d to over 5 million b/d; actual production will depend on the results of future exploration and the pace of foreign investment. Investment in turn will depend on national policies that promote or discourage investment, wildcards such as regional conflict and world oil prices, and on the degree of regional cooperation in developing new export routes. [redacted]

Oil Reserves Extensive But Subject to Further Exploration [redacted]

The Caspian's extensive petroleum resource base is a primary factor driving oil production projections. The area remains mostly unexplored by Western standards, and total resource estimates will evolve as oil field operators gain more data—particularly in promising offshore sections of the northern Caspian. [redacted] the region holds at least 65 billion barrels of recoverable resources—similar to the original estimate for the North Sea—including about 26 billion barrels of proved reserves and 39 billion barrels of probable reserves. *Some industry experts estimate that the region contains an additional 130 billion barrels of possible oil reserves, raising total potential resources to about 200 billion barrels.* [redacted]

Actual reserves ultimately will depend on a combination of the region's natural geological endowment and investment flows that shift in response to commercial, political, and economic conditions. While the Caspian is known to contain a wealth of hydrocarbon-bearing source rocks and potentially oil-bearing structures, the extent of recoverable resources will remain unknown until these structures are drilled. [redacted]

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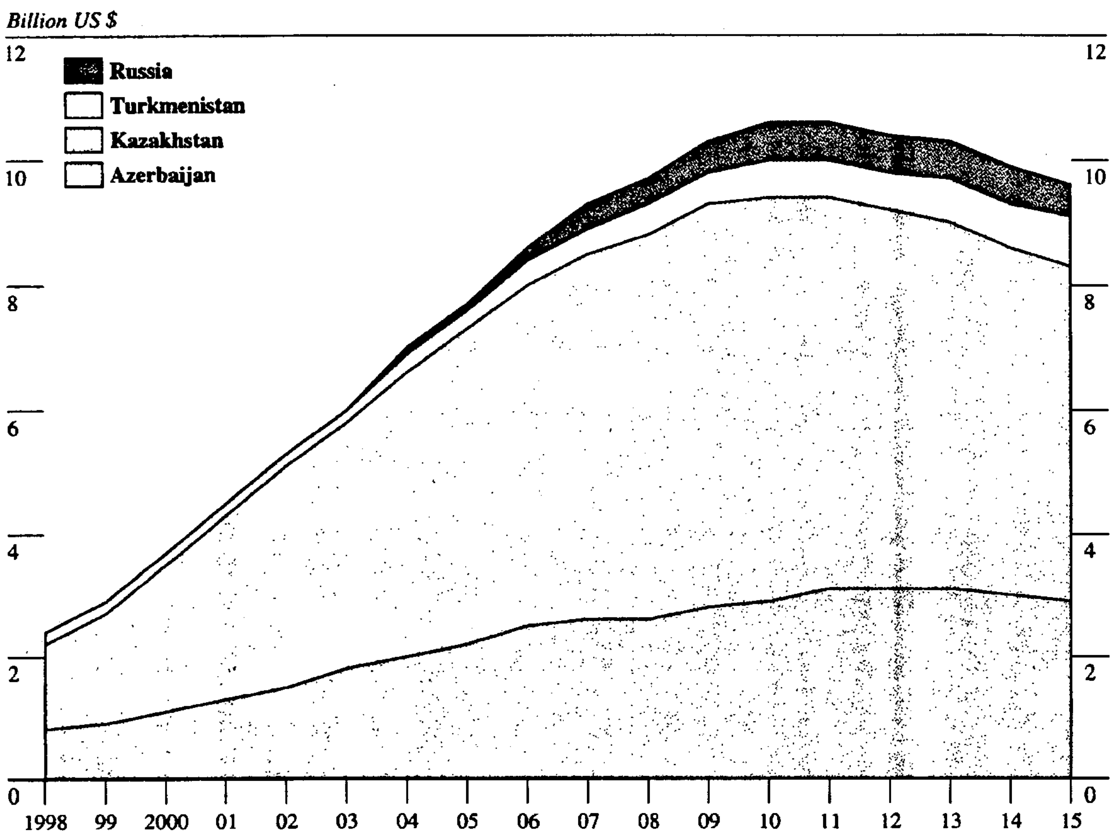
[1] For the purposes of this report, the Caspian region is defined as the four central and northern Caspian Sea littoral countries: Azerbaijan, Kazakhstan, Russia, and Turkmenistan. [redacted]

This memorandum was prepared by [redacted] Office of Transnational Issues, in response to questions raised by policymakers at the Departments of State and Commerce and the National Security Council about oil production potential in the Caspian region. Comments and queries are welcome and may be directed to the Chief, [redacted]

Figure 1
Caspian Oil Investment Requirements, 1998-2015[a]



[a]The figure depicts estimated capital and operating expenses for current and projected future development projects. The cost of exploratory drilling programs is developed separately and is estimated at $12 billion for Kazakhstan, $ 9 billion for Azerbaijan, $6.5 billion for Turkmenistan, and $5 billion for Russia over the forecast period.

Source: CIA and industry estimates.

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Reserve Classifications

There is no universally accepted method for defining in-the-ground oil supplies. The terminology used by Western firms differs considerably from that used in regions of the former Soviet Union. The following definitions are employed in this report for the purposes of discussing Caspian oil production:

- ***Reserves*** or ***Proved Reserves*** commonly refer to oil that producers expect to recover under current economic conditions using available technology.
- ***Probable Reserves*** denote oil that is expected to be extracted from a producing reservoir, but specific circumstances make it impossible to fully count on the production of the oil under current conditions.
- ***Possible Reserves*** refer to oil volumes about which there is insufficient data to indicate whether the oil will be extracted. This oil typically is at the economic and technical margin of what can be produced.
- ***Resources*** represent all reserve categories plus oil that is estimated from a geological perspective but remains undiscovered and beyond current economic and technical means of extraction.

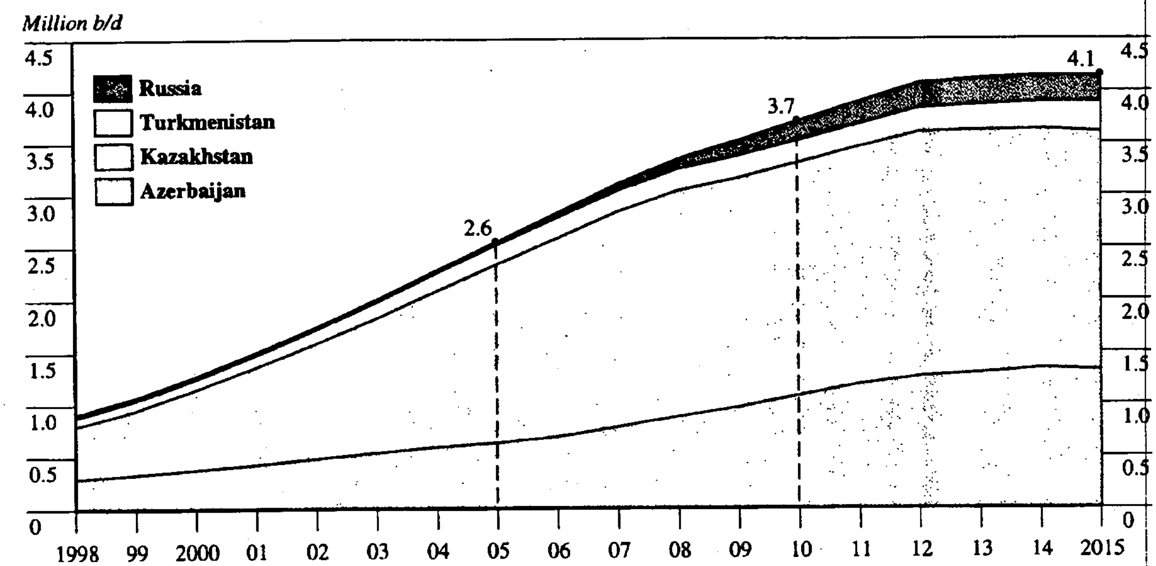
Investment Is Critical

As exploration reveals the extent of the Caspian's resources, it will drive oil production forecasts and figure prominently in investment decisions and regional export planning. Foreign investment will play a critical role in an area where domestic capital is severely constrained. Investment over the next five years is particularly important to ensure that new production sources come on stream as older sources diminish. International oil firms have planned investments approaching $100 billion in the region to date, and interest in the region continues to increase as reserve estimates grow and as commercial incentives develop:

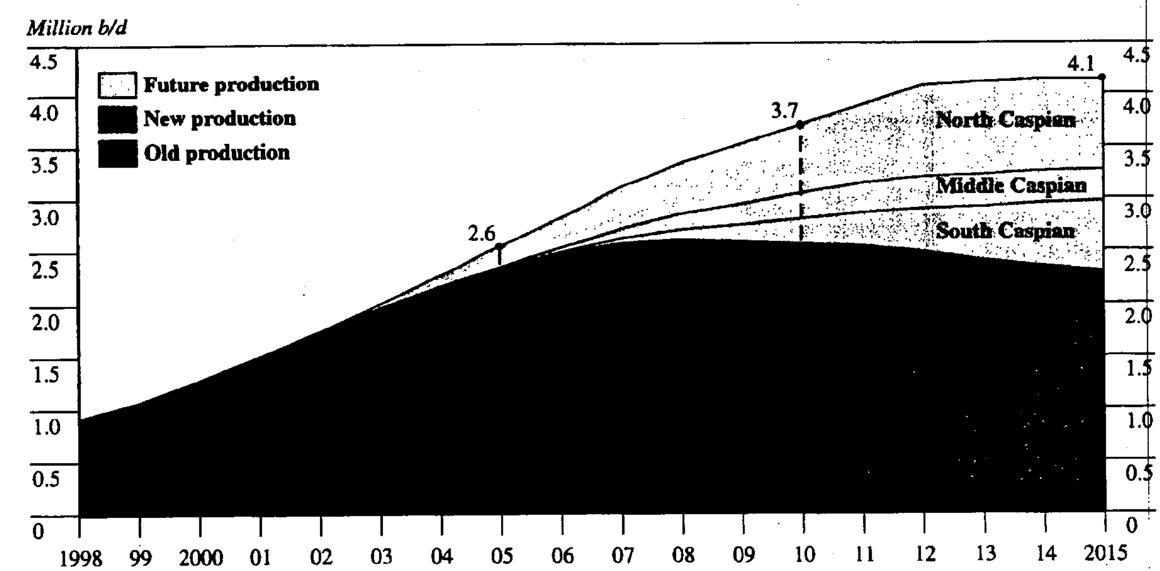
- In July, Azerbaijan signed three separate contracts for new exploration and development projects with major UK energy firms, including an alliance of BP and Statoil, Ramco Energy, and Monument Oil, according to press reports. The deals could be worth $13 billion in new investment if initial exploration reveals large commercial deposits.
- In June, a consortium led by Italy's Agip finalized an agreement with Azerbaijan to develop the offshore Kyurdashi prospect, according to

Figure 2
Caspian Oil Production, 1998-2015

By Country



By Production Source



Source: CIA and industry estimates.

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industry press reporting. [redacted]

Baseline Oil Production Forecast, 1998-2015 [redacted]

Our forecast for Caspian oil production is based on a model developed with the support of industry experts. The model combines a series of [redacted]

- Under our baseline scenario, foreign investment will reach $170 billion—about $10 billion annually—between 1998 and 2015 funding a robust level of exploration projects. At this rate of investment, aggregate oil production will rise from 900,000 barrels per day (b/d) in 1998 to 2.6 million in 2005, 3.7 million in 2010, and about 4 million in 2015. [redacted]

Kazakhstan will contribute the majority of new oil production—more than 60 percent—during the forecast period, followed by Azerbaijan, with smaller amounts from Turkmenistan and Russia. The largest oil volumes will come from production projects currently under development, followed by future projects:

- **New production** resulting from continued high investment in projects under development will supply the main output increase during the forecast period, adding more than 2 million b/d by 2005. Two megaprojects—the Azerbaijan International Operating Company (AIOC) in Azerbaijan, and Tengizchevroil in Kazakhstan—will be the primary drivers behind the boost, providing more than 1 million b/d by 2005 and more than 1.5 million by 2015. These estimates are based on historical field data, current project plans, and the extrapolation of data from similar projects in analogous geological areas.

- **Future production** from discoveries in the next five to 10 years is projected to provide major increases in output beginning in 2005. Future production is impossible to specify without actual field data, but, based on current Caspian development trends, it is likely to be the primary driver of output after 2010. Discoveries in the three Caspian basins—north, middle, and south—probably will continue to fuel production through the end of the forecast period, providing approximately 1.7 million b/d in 2015 and offsetting a slow production decline at older fields. Production from new discoveries could continue to rise beyond the forecast period if investment remains robust.

- **Old production**—the smallest, but most predictable source of Caspian oil output—is estimated by projecting historical data from existing fields. These projects, mostly initiated in the Soviet era and controlled by state oil companies, are likely to continue a slow decline from 400,000 b/d in 1998 to 300,000 b/d by 2015, as a result of depleted reservoirs and scarce capital, according to industry experts.

Our estimates of Caspian oil production are sensitive to the flow of investment. The region's resource base is large enough to support more aggressive exploration if more funding is available than in our baseline scenario:

- A 25-percent increase in overall investment to the region during the forecast period would raise total production to 3 million b/d in 2005, 4.6 million in 2010, and 5 million by 2015, according to our forecast model. Some of the additional funding would help maximize production from ongoing projects, but most of it would facilitate new exploration projects.

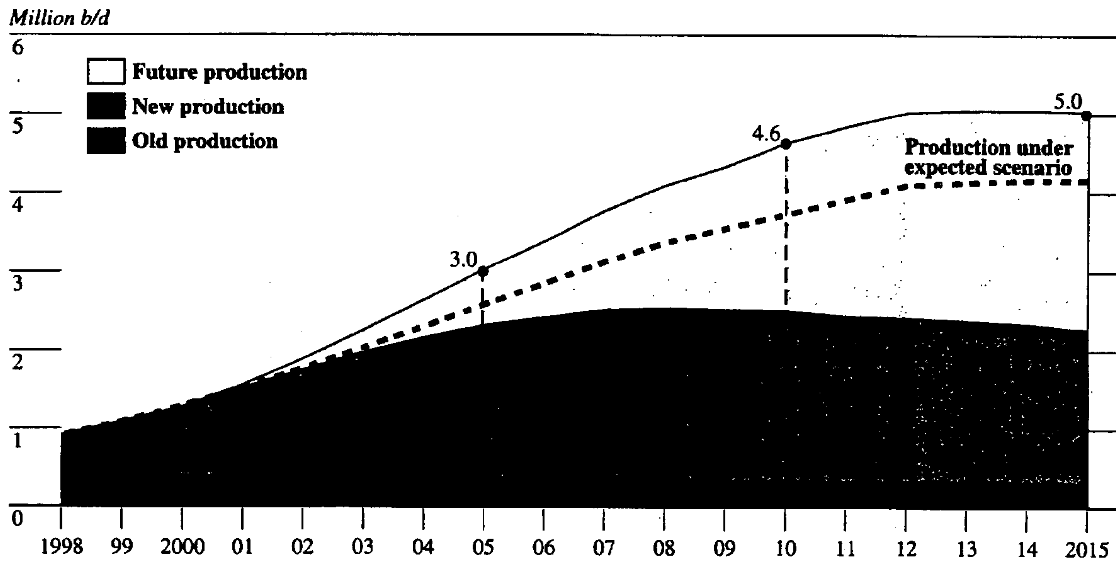
- Similarly, a decrease in investment by about 25 percent over the forecast period would reduce production growth to about 2.2 million b/d in 2005, 2.6 million in 2010, and 2.9 million by 2015. Lower-than-expected investment levels would translate into reduced funding for exploration and growth of development projects.

The oil resource base will play a pivotal production role in the outlying forecast years after 2010. As current development projects begin to slacken, production brought on line from exploration activities will account for a growing share of total output. Eventually, regional production will begin a slow decline as new discoveries taper off; although, it is difficult to predict exactly when a decline will commence. Such a downturn has been delayed for years in other regions including the North Sea and Alaska's North Slope largely because of continuing exploration efforts and the application of new production technology:

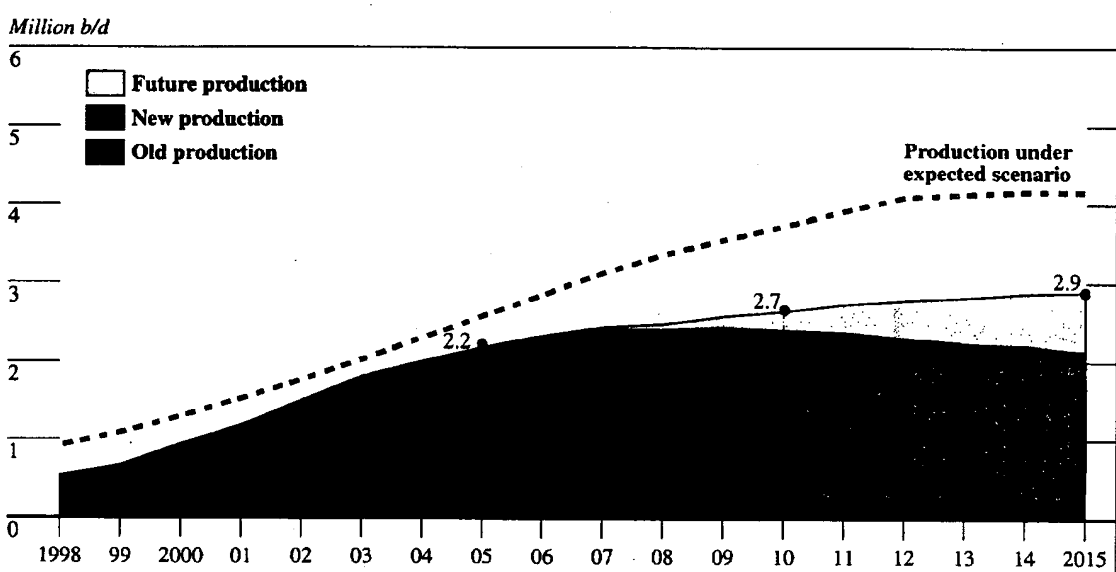
- The discovery of large oil fields in the northern Caspian could significantly expand the region's production forecast, particularly after 2010. The

Figure 3
Alternative Caspian Oil Production Scenario, 1998-2015

Investment Increased 25%



Investment Decreased 25%



Source: CIA and industry estimates.

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[redacted]

Conversely, unexpectedly poor exploration results or low levels of exploration activity would lead to lower production over the forecast period. Achieving a production level of 4 million b/d will require aggressive exploration efforts throughout the region in the next five years. This will require oil companies to test 25 to 35 prospects annually, rather than the handful they are currently examining, according to industry experts:

- Some Western oil executives are doubting preliminary assessments that Azerbaijan's much-touted Absheron Trend lies within the oil-rich south Caspian basin, [redacted] Instead, they believe that the trend lies one ridge beyond AIOC's enormous oil-bearing structure, in a completely different basin with little evidence of major hydrocarbon deposits.

- Officials from the Caspian International Operating Company recently attempted to terminate their contract to develop Azerbaijan's Karabakh prospect in the Absheron Trend. The first two exploratory wells drilled in the prospect—originally promoted as one of the most promising in the region—yielded no oil and only noncommercial amounts of natural gas, according to press reports. [redacted]

Oil Prices and Other Factors Could Affect Investment [redacted]

The world oil market outlook presents the greatest element of uncertainty in our production forecast, which implicitly assumes that world oil prices over the forecast period will average $15 to $18 in real terms and support adequate returns for investors. Many international energy investors are willing to ride out short-term price drops to meet long-term demand expectations. However, an outlook for prolonged low world oil prices—stemming from continued financial problems in Asia and low global demand—could cause investors to scale back involvement in Caspian projects that operate at the margin of profitability:

- In early October, a senior AIOC official confirmed that AIOC will delay the implementation of phase-one development in early 1999 by several months in part because of the continued slump in world oil prices, [redacted] AIOC wants to avoid overcommitting itself to an aggressive development schedule in light of a recent forecast by British Petroleum that predicts the world oil price slump will last for approximately five years.

- At the same time, the timing between field discovery, initial production, and peak production could affect the region's production outlook. [redacted]

A number of other unpredictable commercial and political factors will influence the pace of investment and production levels. While some of these factors can be anticipated, the element of luck—especially in discovering oil—ultimately will play a major role in either undermining or enhancing the willingness of firms to invest in Caspian projects:

- **Business climate.** The continued flow of foreign investment into the Caspian region largely will depend on improvements to erratic local business sectors, which in turn depend on economic reform efforts of Caspian governments. Reform programs in Russia, Azerbaijan, and Kazakhstan generally have been moving forward, while Turkmenistan has shown only limited interest in change. Foreign investors could increasingly back away from large deals unless regional governments remain on the reform track and provide consistent legal frameworks for contracts.

- **Regional stability.** Military confrontations, assassinations, or succession struggles around the Caspian region could directly disrupt oil development activities, prevent or delay pipeline projects, and scare away risk-averse foreign investors. Numerous ethnic and nationalist conflicts are simmering in the region—in Chechnya, Dagestan, Abkhazia, Nagorno Karabakh, and southeastern Turkey, and Georgia—with few prospects for lasting resolutions.

- **Infrastructure and equipment availability.** The lack of equipment—especially drilling rigs—throughout the Caspian has hampered several exploration and production projects. For example, there is only one deepwater drilling rig available to explore Azerbaijan's numerous offshore prospects, according to industry press reporting. [redacted] If this shortage of critical equipment and infrastructure is not overcome in the coming years, contracts will be delayed. [redacted]

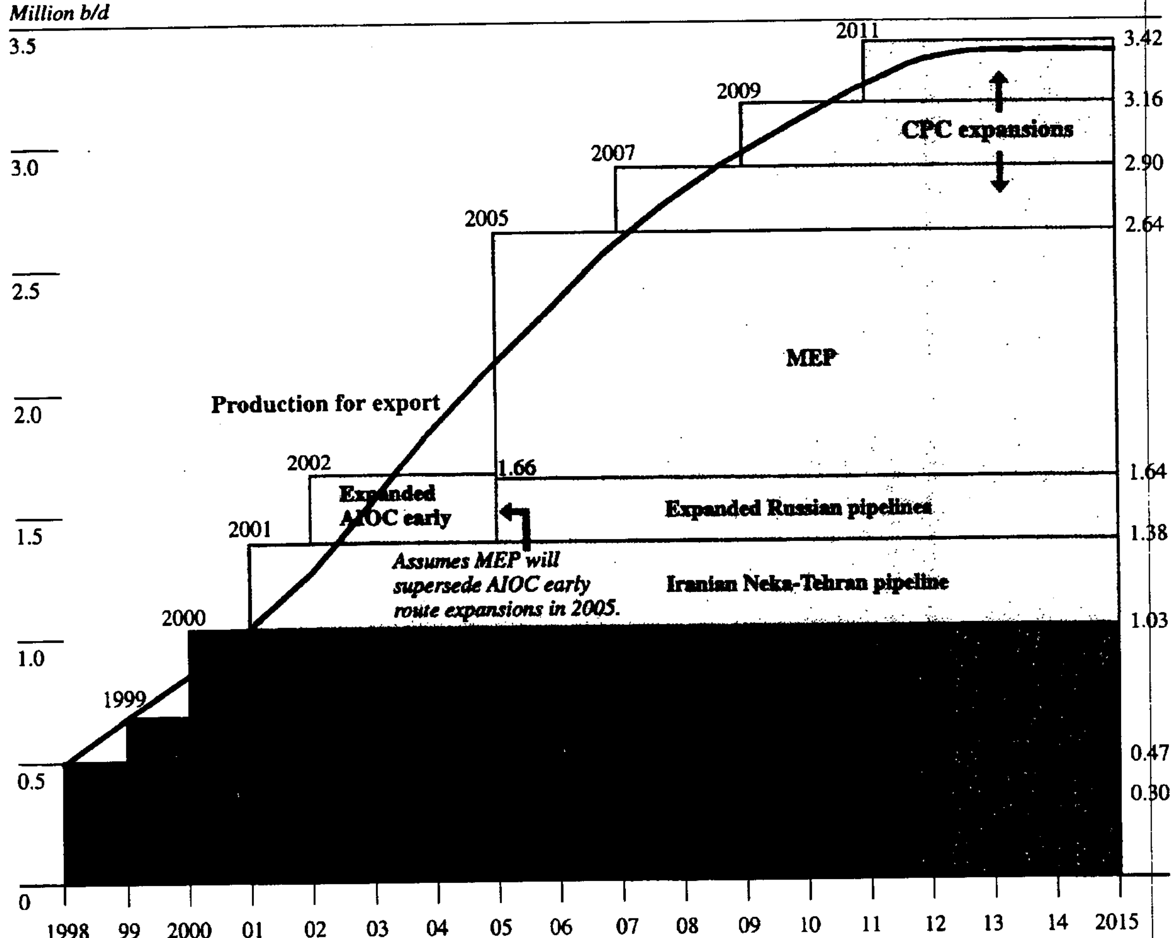
New Export Capacity Needed [redacted]

Expanding oil production and new discoveries will set the stage for the construction of new regional export pipelines. The actual decision to build pipelines and the timing of

Figure 4
Potential Timing and Capacity of New Caspian Export Options

☐ Selected future export options.

■ Export routes currently operating, under construction, or in advanced stages of negotiation.



Source: CIA and industry estimates.

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construction will be determined by the availability of reserves levels and production volumes needed to justify pipeline costs. Pipeline investors will require throughput guarantees before undertaking costly projects, and oil producers are likely to seek their most economical option by expanding current routes to keep pace with incremental production until they reach maximum design capacity[2]:

- At the same time, commitments to new pipeline routes will encourage continued investment in upstream activities by ensuring investors that they will be able to export the oil they produce. The continued absence of an agreement on a major new Caspian export pipeline could discourage producers from committing to long-term production plans.

In our baseline production scenario, Caspian oil producers will require approximately 3 million b/d in new export capacity by 2015:

- The bulk of Caspian oil production will be available for export to world markets. Consumption levels in Azerbaijan, Kazakhstan, and Turkmenistan[3] are likely to be moderate, amounting to about 400,000 b/d in 1998 and increasing by 3 to 5 percent in each country each year of the forecast, reaching approximately 820,000 b/d by 2015, according to our estimates of average annual economic growth and oil use in the region.

- Based on these growth estimates, oil volumes available for export are likely to increase from about 500,000 b/d in 1998 to 2 million in 2005, 3 million in 2010, and 3.3 million in 2015.

US Policy Implications

Oil development projects already underway are likely to produce sufficient volumes in the next decade to justify US-promoted export corridors—such as a Baku-Ceyhan MEP and the CPC project—provided investment remains robust and regional production is aggregated. Forecast production levels, however, are not large enough to support more than two major new export pipelines. Both the CPC project and an MEP will have to move forward soon to keep pace with expected production. Protracted negotiations among central players over regional pipelines could delay construction and cause planned projects to fall out of step with production schedules:

- Azerbaijan has been resisting an intergovernmental process with transit states that will facilitate an MEP project and both Azerbaijan and AIOC have been reluctant to include other producers in an MEP. Oil production

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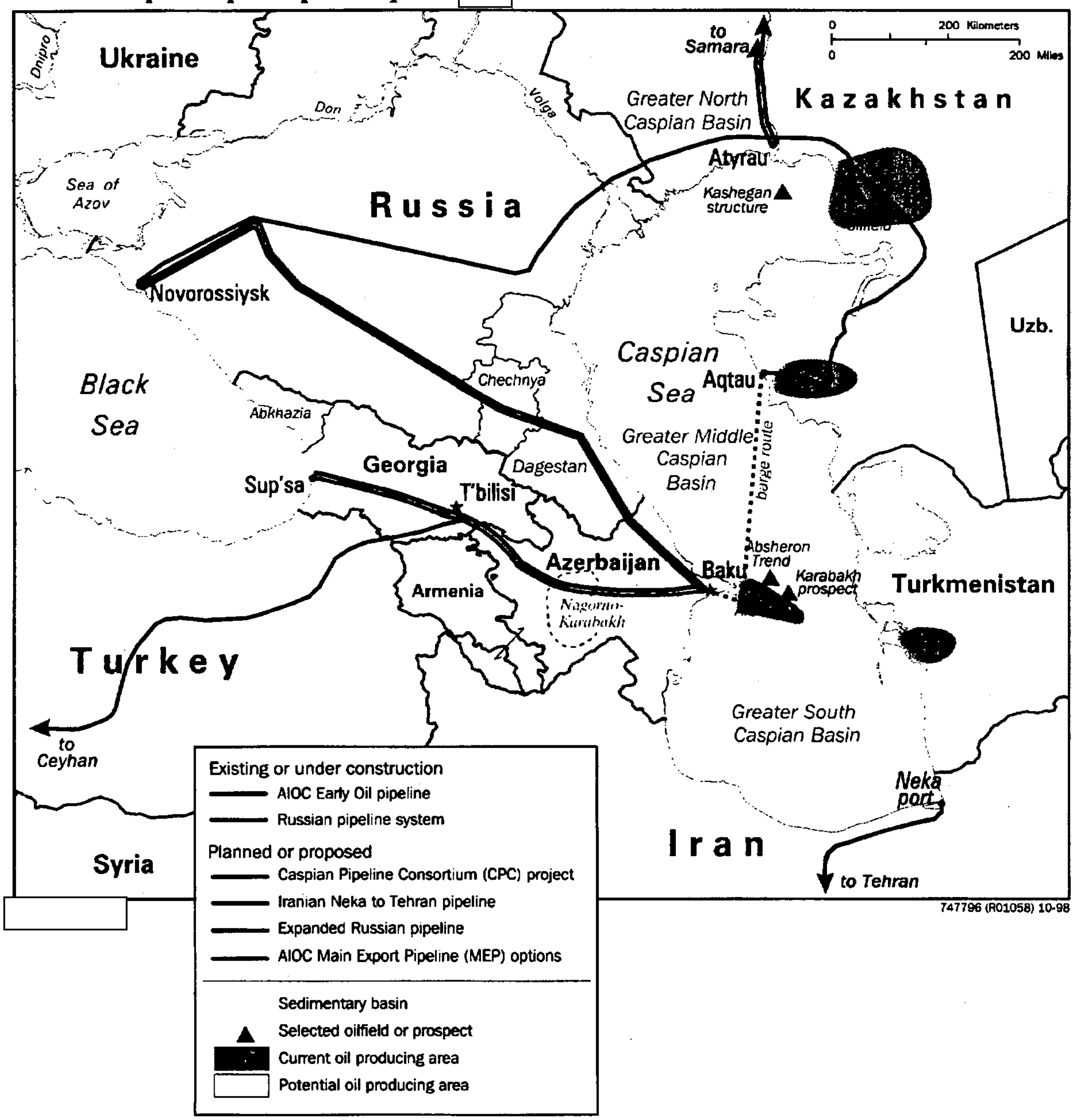
[2] See Appendix B: "Potential Caspian Pipeline Projects."

[3] All Russian oil production from the Caspian region is likely to be exported because enormous reserves in other areas are sufficient to supply domestic needs.

Figure 5
Selected Caspian Export Pipeline Options



from Azerbaijan alone is unlikely to fill a commercially feasible major new pipeline to the Mediterranean Sea.

- [redacted]

Significant delays in regional pipeline construction will prompt producers to turn to other export schemes to meet their needs. Iran and Russia could absorb growing volumes into their own export networks and position themselves to capture ever larger future Caspian volumes, delaying or possibly even obviating the need for an MEP. Iran is attempting to secure intermediate Caspian oil production with a series of swap schemes:

- In June, Tehran unveiled a three-phase, multiyear plan to attract up to 1.6 million b/d of Caspian oil. In phase one, Iran will construct a 350,000-b/d pipeline to deliver Caspian oil to its northern refineries and export an equal amount of its own oil via the Persian Gulf on behalf of Caspian producers. The second phase will increase the pipeline capacity to 800,000 b/d by 2005, and the third phase calls for the construction of an 800,000-b/d trans-Iranian pipeline.

- The completion of phase two of the Iranian plan could provide the intermediate export capacity needed for expanding eastern Caspian production and effectively preempt the Baku-Ceyhan route. [redacted]

Appendix A

Appendix B

Potential Caspian Pipeline Projects

Several international consortiums are promoting major new pipelines to transport Caspian oil to world markets. Forecast production levels, however, are unlikely to support more than two of the new export proposals below in addition to existing routes—such as early AIOC oil routes and older Russian routes—which are likely to be upgraded. We estimate that Caspian oil exporters will require approximately 3 million b/d of new capacity by 2012, while the following export proposals represent about 4.5-5 million b/d of new capacity.

Main Export Pipeline (MEP). Oil field operators and producing and transit countries are negotiating the construction of a large-capacity pipeline to export the bulk of Caspian oil after 2004. Two main route options—from Baku to Supsa and from Baku to Ceyhan—have emerged as the most likely choices. AIOC is scheduled to recommend a route to Azerbaijan by late October. The 925-kilometer Supsa route probably would cost $1.3-1.5 billion to build, while the 2,000-kilometer Ceyhan route would cost about $2.7-3 billion, depending on its capacity, according to industry estimates. Ultimately, AIOC is likely to recommend the construction of a 500,000-b/d pipeline to Supsa with an option to expand the pipeline's capacity to 1 million b/d and extend it to Ceyhan if volumes reach sufficient levels. However, support for a route to Ceyhan is building among eastern Caspian oil producers. A Supsa route will have to contend with Turkish reluctance to increase tanker traffic in the Bosporus, while a 1-million-b/d pipeline from Baku to Ceyhan will require supplemental oil from the eastern Caspian to ensure its commercial viability.

Caspian Pipeline Consortium (CPC) Project. Russian and CPC officials are in the final negotiating stages for a 1,500-kilometer pipeline that primarily will carry oil from the Tengiz oil field in Kazakhstan to the Russian Black Sea port of Novorossiysk beginning in late 2000. The pipeline's initial capacity will reach 560,000 b/d, while a planned second phase will increase capacity to 1.34 million b/d by 2012. Project cost estimates recently rose from about $2 billion to $3 billion, raising some questions about the pipeline's commercial appeal in an environment of depressed world oil prices, but CPC officials claim they are still moving forward, according to press reports. In addition, Russia has indicated that it plans to increase the capacity of existing regional routes, such as the Atyrau-Samara pipeline, in the next decade in an attempt to export more Caspian oil via the Russian pipeline system.

Iranian Pipeline Plans. Iran has proposed a long-term plan to transport up to 1.6 million b/d of Caspian oil through its territory by expanding current small-scale swap arrangements with oil field operators in Turkmenistan. Under the swap deal, Iran absorbs about 40,000 b/d of Caspian oil for its northern refinery system, while exporting the same amount of its own oil via the Persian Gulf on behalf of Caspian swap partners. Iran recently floated international tenders for the first phase of the plan, which involves boosting swap volumes by constructing a new 350,000-b/d pipeline from Iran's Caspian Sea port of Neka to Tehran. The second phase would increase the capacity of the Neka-Tehran pipeline to 800,000b/d, while the third phase calls for the construction of an 800,000-b/d trans-Iranian pipeline from the Caspian Sea to the Persian Gulf in several years.

Chinese Pipeline Option. China has proposed the construction of a 500,000-b/d, 3,000-kilometer pipeline from Kazakhstan to western China to export oil from concessions operated by Chinese oil companies. The revenues generated by the sale of throughput volumes are unlikely to support the estimated $3.5 billion cost of the project, although China may view the pipeline as a political necessity rather than an economic one.

Eastern Europe Pipeline Schemes. A number of East European governments and energy firms are promoting projects to move Caspian oil via tankers between ports on the Black Sea and then on to Western Europe via pipelines with capacities ranging from 500,000 b/d to 1 million b/d. The proposed pipelines also would supply local markets in transit states. Greek companies, Bulgaria, and Gazprom proposed a 300-kilometer, $1 billion Bosporus bypass pipeline from Bulgaria to Alexandroupolis, Greece. Gazprom recently scaled back its involvement in the project, however, probably because of financial difficulties. Ukraine is promoting a 700-kilometer, $800 million pipeline to link the Black Sea port of Odessa with the Russian pipeline system that reaches Western Europe. Similarly, Romanian and Italian companies are proposing a 1,600-kilometer, $1.6 billion pipeline to carry Caspian oil from Romania through Serbia, Croatia, and Slovenia to Trieste, Italy.

Appendix C

Major Caspian Oil Development Projects [redacted]

Country and Project	*Potential Oil Resources (barrels)*	*Estimated Current Production (b/d)*	*Estim[redacted]ak Production (b/d) and Year*	*Estimated Total Cost ($)*
Azerbaijan				
Abikh	4 billion	0	na	4 billion
Absheron	1 billion	0	na	na
Atazhgan, Yanan-Tava, Mugandeniz	500 million to 1 billion	0	na	na
AIOC/Azeri, Chirag, Guneshli	5.8 billion	90,000	800,000 in 2012	9 billion
CIPCO/Karabakh	585 million to 1.1 billion	0	na	2 billion
Guneshli/shallow	230 to 750 million	100,000	100,000 in 1998	1 billion
Inam	875 million to 2.2 billion	0	na	2 billion
Kyurdashi	365 to 725 million	0	100,000 in (na)	2.5 billion
Lenkoran Deniz/Talysh Deniz	365 to 730 million	0	na	2 billion
Muradhanli	240 million	0	26,000 in 2003	360 million
Nakhichevan	700 million	0	na	na
Neft Dashlary	100 million	12,000	28,000 in 2003	220 million
NAOC/Ashrafi-Dan Ulduzu	730 million to 1.1 billion	0	na	1.5 billion
Oguz	300 million	0	na	na
Shahdeniz	1.8 to 3.7 billion	0	na	4 billion
Southwest Gobustan	100-150 million	0	na	900 million
Yalama	400 million	0	na	2.5 billion
Kazakhstan				
Aktyubinsk/Aktobe	950 million	55,000	79,000 in 2003	na
Buzachi North	535 million	0	87,000 in 2003	1.5 billion
Dunga	120 million	0	35,000 in 2003	250 million
Karachaganak	2.4 billion	50,000	230,000 in 2003	7 billion
Karakuduk	127 million	0	35,000	260 million
Karazhanabas	620 million	56,000	110,000 in 2005	1.7 billion
Kenbai	226 million	3,000	20,000 in 2002	470 million
Mangistau	2.4 billion	na	na	4.1 billion
OKIOC/Kashegan	9 billion	0	1.2 million in 2012	14 billion
Tengizchevroil	16 billion	190,000	800,000 in 2013	20 billion
Uzen	580 million	65,000	140,000 in 2004	1.2 billion
Zhanazhol	750 million	6,000	60,000 in 2001	770 million
Zhetibai	740 million	12,000	33,000 in 2005	220 million
Other	260 million	40,000	86,000 in1999-2002	350 million
Turkmenistan				
Banka Gubinka/ Banka Barinova	4.4 billion	0	na	na

Country and Project	*Potential Oil Resources (barrels)*	*Estimated Current Production (b/d)*	*Estimated Peak Production (b/d) and Year*	*Estimated Total Cost ($)*
Turkmenistan				
Cheleken	320 million	25,000	85,000 in 2004	1 billion
Garashsyzlyk	730 million to 3.6 billion	0	na	na
Goturdepe	586 million	37,000	166,000 in 2004	1.2 billion
Kerpedzhe	82 million	8,000	10,000 in 1999	170 million
Nebit Dag/Burun	200 million	10,000	27,000 in 2003	300 million